



Intel SpeedStep[®] technology Backgrounder

MOBILE PCs INCORPORATE DESKTOP-CLASS PERFORMANCE

MOBILE PENTIUM[®] /// PROCESSORS FEATURING INTEL[®] SPEEDSTEP[™] TECHNOLOGY

On January 18, Intel will release its latest mobile Intel[®] Mobile Pentium[®] /// processors with an innovative performance technology called Intel[®] SpeedStep[™] technology. Built into Mobile Pentium /// processors rated at frequencies of 600 MHz and 650 MHz, this technology from Intel provides desktop class performance with all the benefits of mobility. This new technology will provide additional performance to the already advanced features included in the Intel Mobile Pentium /// processor. These advanced features include Intel's innovative .18 micron process providing much higher clock speeds within the standard thermal envelope, a fast 100-MHz system bus for faster access to memory and graphics, and an integrated on-die 256K full speed advanced transfer. In addition, Seventy Internet Streaming SIMD (single input multiple data) instructions were added to allow mobile PCs users to make fast work of the demanding video, graphics and audio now prevalent on the internet.

Intel SpeedStep technology Provides Two Performance Modes

Mobile Pentium /// processors featuring Intel SpeedStep technology can be switched between two performance modes--maximum performance and battery-optimized performance--either automatically or by user command. By default, mobile PCs with Mobile Pentium /// processors featuring Intel SpeedStep technology detect when they are plugged into or unplugged from an AC outlet. When a system is unplugged, the processor

core automatically drops to 500 MHz from the peak frequency of 600 MHz or 650 MHz. At the same time, the operating voltage of the processor drops to 1.35 volts from 1.6 volts. Plug that system back into an outlet, and the processor automatically speeds back up to peak frequency and boosts the voltage to 1.6 volts.

Users can also manually adjust the Intel SpeedStep technology mode. For example, if a user needs to conduct a presentation away from an outlet, he or she can use the Intel SpeedStep technology application to put the mobile PC into maximum performance mode. The application is accessed via an icon in the Windows Taskbar. When the presentation is complete, the system can be put back into battery-optimized performance mode.

When switching performance modes, Intel SpeedStep technology can reduce the active power of the processor up to 45% while maintaining nearly 80% of the maximum performance. Switching voltage levels provides significant power savings, because power consumption occurs in proportion to the square of voltage. By contrast, clock frequency has a linear relationship with power consumption. The result: A slight reduction in voltage yields a significant impact on power savings. The overall impact on battery life depends on the application running and the mobile PC design and components.

The MHz difference between the Battery Optimized and Maximum Performance modes is expected to be up to 150 MHz, but may vary over time. In addition, the Battery Optimized Performance mode will operate at 1.35 volts, but the .18 micron process technology will support voltage levels as low as 1.1 volts.

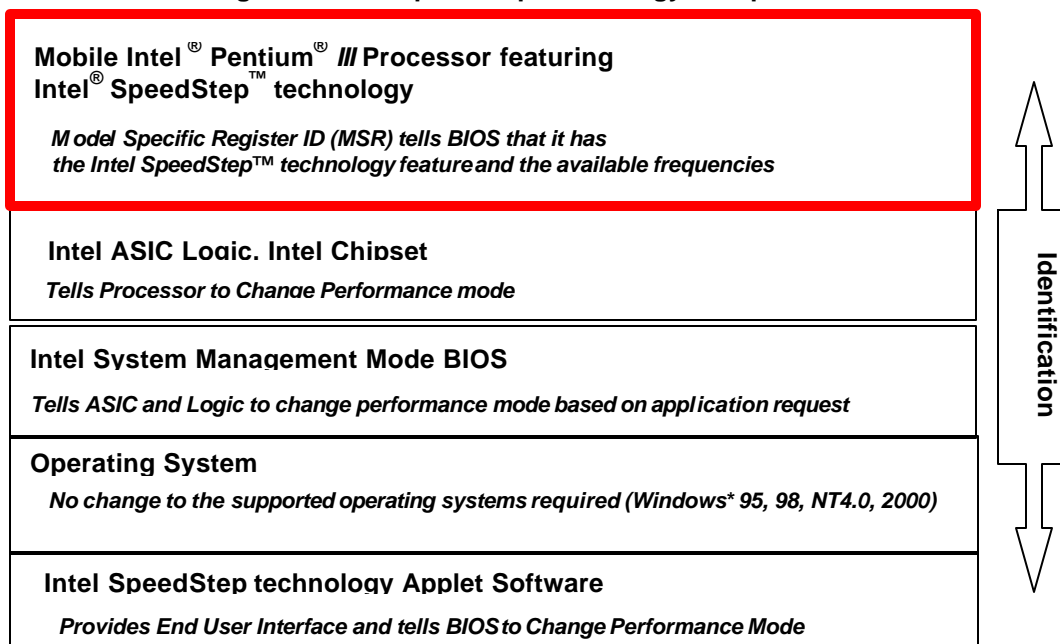
Intel® SpeedStep™ technology Components

Intel® SpeedStep™ technology requires many components and advanced technologies developed by Intel (see figure 1). It all starts with the mobile Intel Pentium® III processor featuring Intel® SpeedStep™ technology. We have added some advanced processor features to enable this new technology. With these additions to the processor's

design, we are able to dynamically switch both voltage and frequency in less than a blink of an eye or 1/2000th of a second. This all occurs without any interruption to the application the user is running. On the manufacturing side, we have implemented a special test process to allow the mobile Intel Pentium III processor featuring Intel SpeedStep technology to operate at multiple frequencies and voltages.

In addition to the processor, Intel developed both the hardware and software components necessary to make this technology work seamlessly, including the system BIOS, end user interface software, switch control ASIC and support in the chipset. To provide the end user with a simple intuitive interface, Intel developed the Intel SpeedStep technology application software that allows for automatic or user controlled performance mode switching. Intel® SpeedStep™ technology is supported under all major operating systems, including Windows* 98, Windows* 95, Windows* NT 4.0, and the upcoming Windows* 2000 through a common code base. No change to the supported operating systems or software applications is needed in order to take advantage of Intel SpeedStep technology.

Figure 1: Intel SpeedStep technology Components



Processor specifications:

Mobile Pentium® III processor featuring Intel® SpeedStep™ technology 650MHz

When plugged in (Maximum Performance Mode): Runs at 650MHz, 1.6 volts,

Active Power 9.1 watts, Thermal Design Power typical 14.0 watts

When in Battery Optimized Mode: Runs at 500MHz, 1.35 volts,

Active Power 5.1 watts, Thermal Design Power typical 7.9 watts

Mobile Pentium® III processor featuring Intel® SpeedStep™ technology 600MHz

When plugged in (Maximum Performance Mode): Runs at 600MHz, 1.6 volts,

Active Power 8.5 watts, Thermal Design Power typical 13.0 watts

When in Battery Optimized Mode: Runs at 500MHz, 1.35 volts,

Active Power 5.1 watts, Thermal Design Power typical 7.9 watts

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